

DEPARTMENT OF TRANSPORTATION**ENGINEERING SERVICE CENTER**

Transportation Laboratory

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**METHOD OF DETERMINING THE STRENGTH OF
HEADLIGHT GLARE SCREEN POSTS**

CAUTION: Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Section E of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

A. SCOPE

The procedure which is used in determining the acceptability of headlight glare screen posts is described in this test method. The test ensures adequate strength and minimum yielding of glare screen posts.

B. APPARATUS

1. For the strength test of the metal post, use testing apparatus and test fixtures, similar to that shown in Figures 1, 2, and 3, which will provide for the application of a distributed load centered at the projection of the neutral axis on the metal post surface without impending inherent twisting or lateral deflection.
2. A calibrated compression/tension testing machine or a similar device capable of applying loads at a rate of not more than 12 mm/min is required.
3. A dial gage, or an equivalent displacement measuring instrument capable of measuring to within 0.01 mm is required.
4. A protractor is required.
5. A tape measure or other suitable measuring device is required.
6. A snatch block will be used to equalize the force in the cable. The sheave will have suitable lubricated bearings to minimize friction and an outside diameter of 150 ± 10 mm. The working load capacity should be 0.5 tonne minimum.
7. A 10-mm diameter wire rope having a net length of 1.22 m with a hook attached to each end is required.
8. A 200 by 75 by 12.5 mm mild steel plate, as shown in Figures 5A and 5B, is required. The two holes in the plate are to be spaced so that the tails of wire rope, which are separated by the sheave, will be parallel.
9. Two eyebolts to be bolted on the 200 by 75 by 12.5 mm steel plate are required.
10. Two small "C" clamps are required.

C. TEST PROCEDURE

1. Arrange the apparatus in the testing machine as shown in Figure 1.

2. Slide the bottom arm of the test fixture frame in the bottom bracket and fix the position so that the load will be applied at a point representing the center of the glare screen. A set screw may be used.
3. Measure and record the post dimensions on Form TL-0610.
4. Bolt the headlight glare screen post on the test fixture. Position the post so that the load is applied perpendicular to the glare screen and in the direction which offers the least bending resistance. Turn nuts until they are hand tight only. If mounting holes in the glare screen posts are slightly smaller than mounting bolt diameters, post holes may be enlarged to provide a snug fit. A post mounting adapter similar to the one shown in Figure 5 may be used to allow glare screen posts normally mounted on concrete barrier rail or post with a different base plate bolt design to be attached to the test fixture. Bolts and bolt patterns used to mount the posts may vary depending on the post design.
5. Clamp the 200 by 75 by 12.5 mm loading plate to the barrier railing post with two "C" clamps; position the two clamps along the centerline of the loading plate. Locate the loading plate so that the neutral axis of the steel post coincides with the center of the loading plate, as shown in Figure 5B. Position the steel loading plate along the post so that the load is applied at the point where the center of the glare screen panel would be located as shown in Figures 4 and 5A. It may be necessary to install shims of appropriate thicknesses between the mounting plates to which the glare screen post is attached and the upper arm of the test fixture frame so that the neutral axis

of the post coincides with the testing machine's loading axis.

6. Apply a 90 N preload on the post and tighten post-mounting nuts until they are snug. This ensures that bolt connections are in good bearing and that joint slippage will not occur while measuring deflections.
7. Position the dial gage so that the deflection can be measured along the axis of the load; take an initial reading of the distance between the bottom of the post and the top of the bottom arm of the test fixture with a 90 N preload on the post.
8. Place a total load of 2670 N on the post. Apply this load at a rate of not more than 12 mm/min. Measure the angle at the end of the post due to twisting, if any, and record. Release the load back to the initial preload.
9. Take a final reading on the dial gage. Subtract the initial reading from the final reading to determine the permanent deformation.

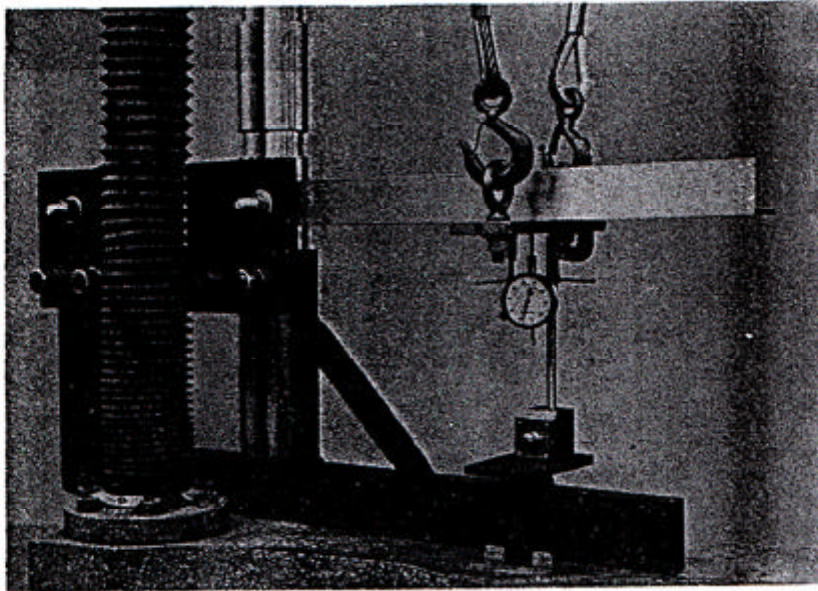
D. REPORTING RESULTS

Report all test results on Form TL-0610. Record post type and dimensions, the amount of permanent deformation in any direction, and the twist angle.

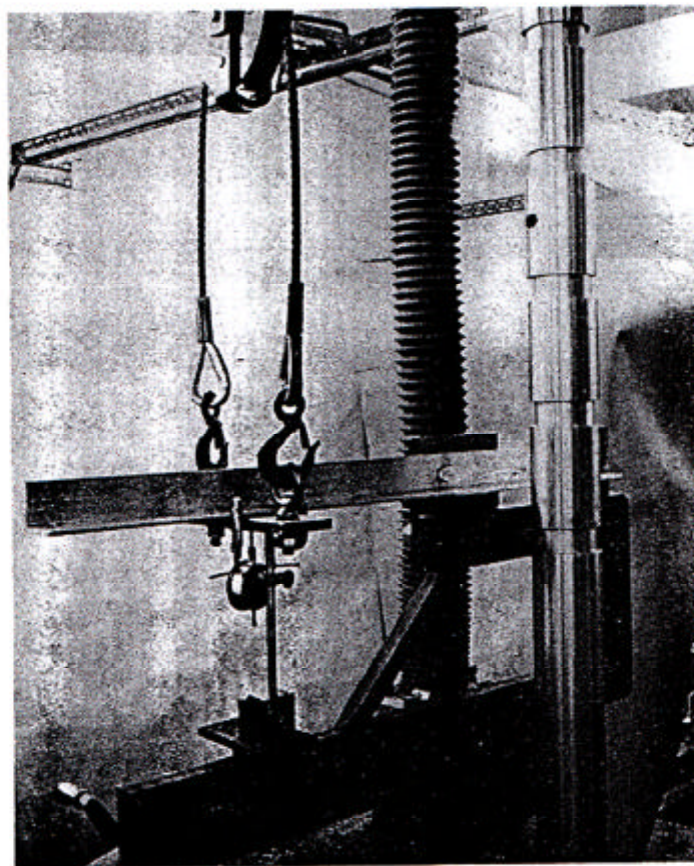
E. SAFETY AND HEALTH

Prior to handling, testing or disposing of any waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0 and 10.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. Users of this method do so at their own risk.

End of Text (California Test 680 contains 7 pages)

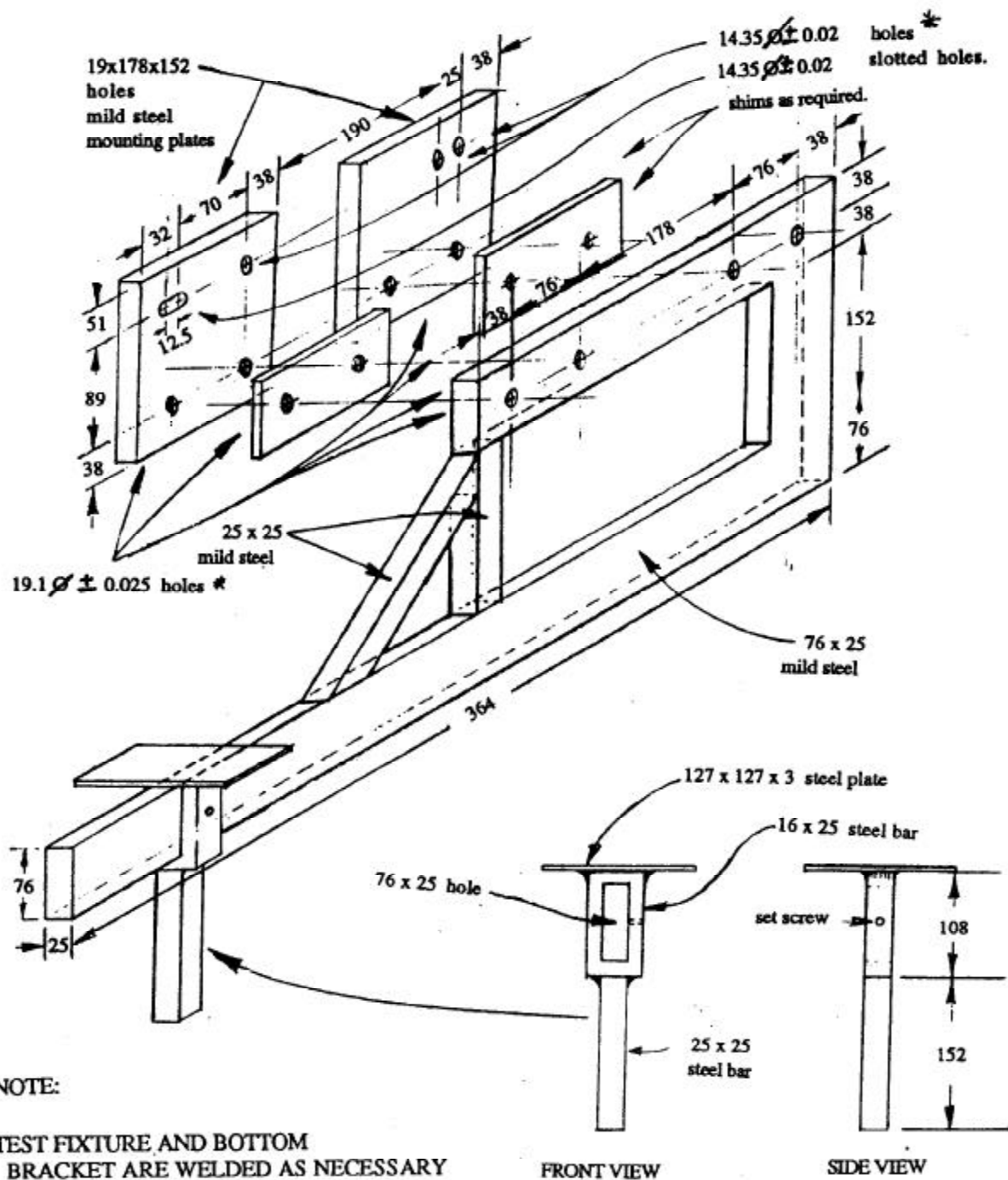


1-A FRONT VIEW



1-B REAR VIEW

FIGURE 1 - GLARE SCREEN POST TESTING APPARATUS



* BOLTS USED ARE TO BE FIT TO HOLES TO PROVIDE A 0.05 mm CLEARANCE.

ALL DIMENSIONS SHOWN IN THIS FIGURE
ARE IN MILLIMETERS (mm).

FIGURE 2 - GLARE SCREEN POST TEST FIXTURE AND BOTTOM BRACKET

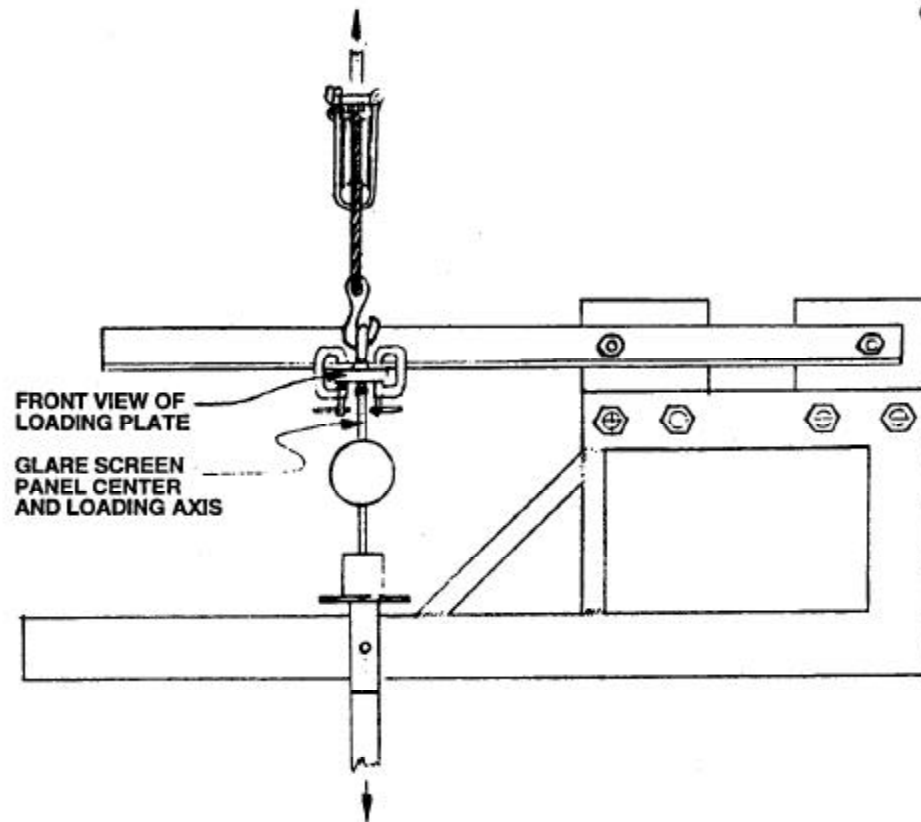


FIGURE 3-A - REAR VIEW OF APPARATUS

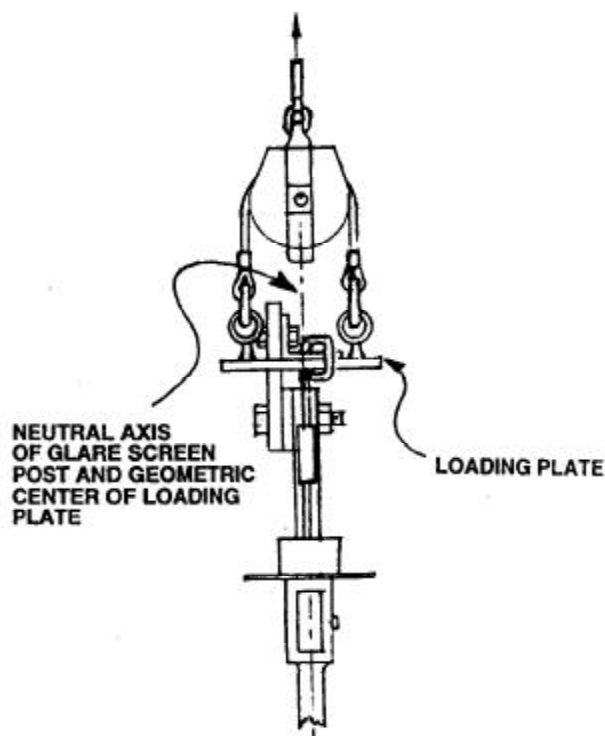


FIGURE 3-B - END VIEW OF APPARATUS

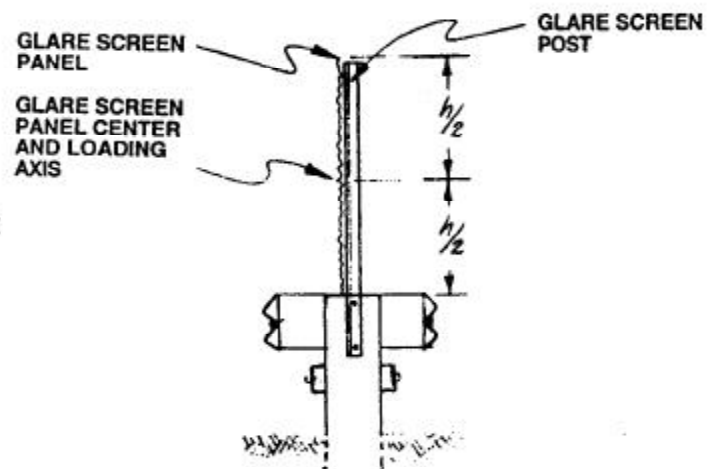
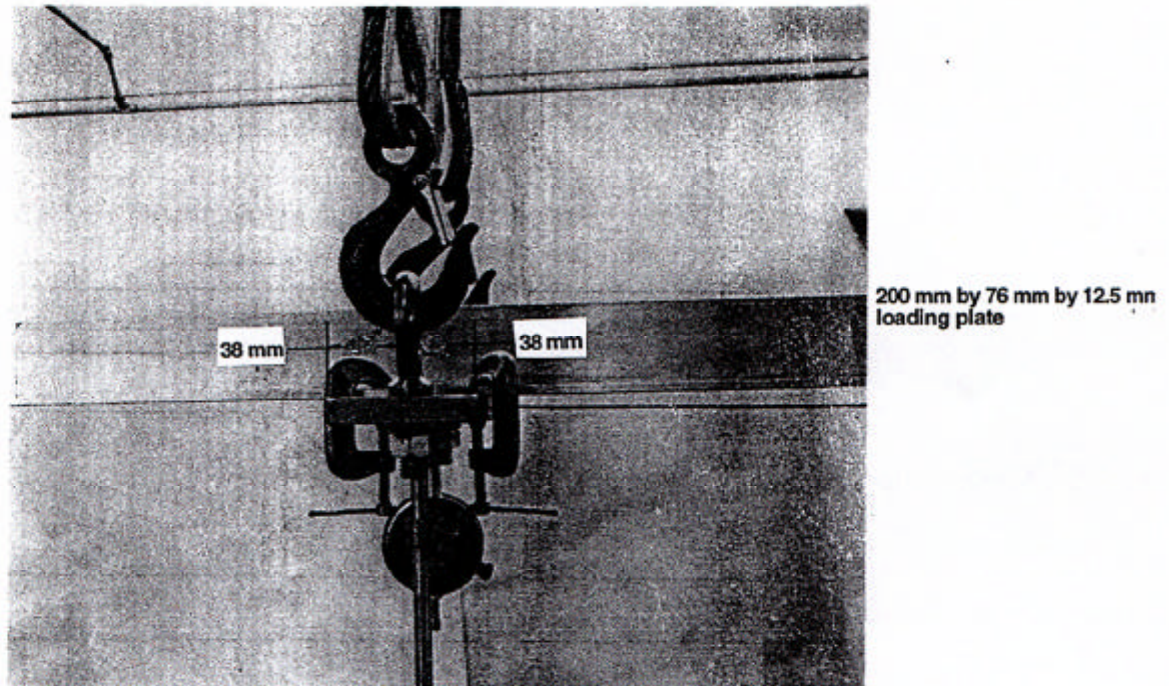
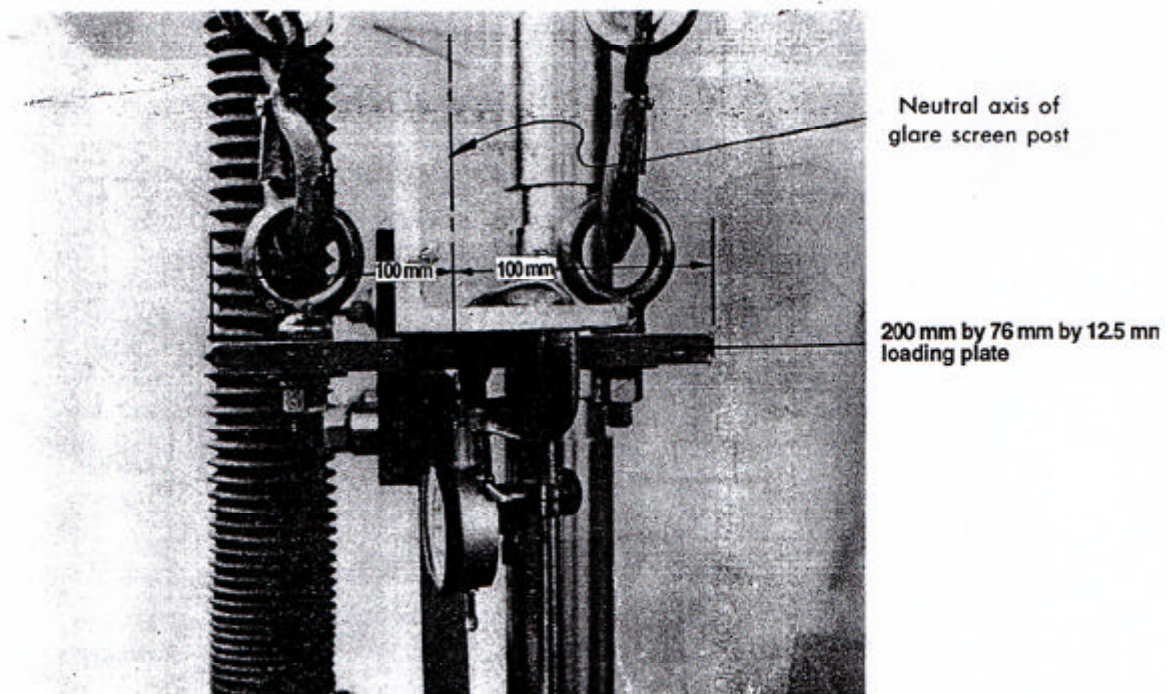


FIGURE 4 - METAL BEAM BARRIER



5-A - REAR VIEW SHOWING LOADING PLATE MOUNTING POSITION



5-B - END VIEW SHOWING HOOKS, EYEBOLTS, LOADING PLATE, AND CLAMPS

FIGURE 5. 200 mm by 76 mm by 12.5 mm LOADING PLATE POSITION

**NOTE: POST MOUNTING ADAPTOR TO BE MADE
OF MILD STEEL AND WELDED AS
NECESSARY**

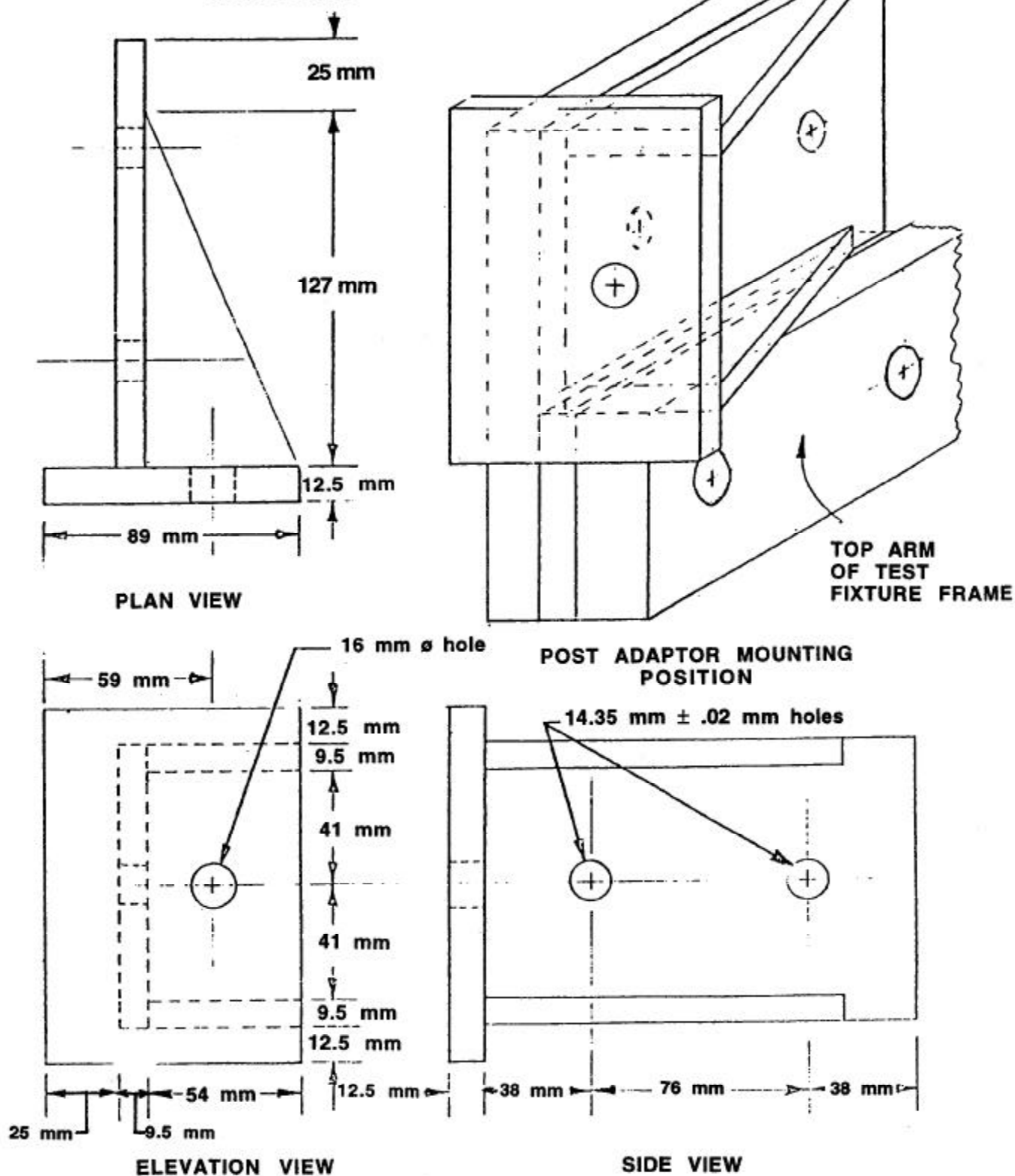


FIGURE 6 - POST MOUNTING ADAPTER